REDACTED

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

BREAKWATER TRADING LLC, and RICHARD HERSHEY,	Case No. 05 C 4681
Plaintiffs,	
vs.	
PACIFIC INVESTMENT MANAGEMENT COMPANY LLC and PIMCO FUNDS,	
Defendants.	

AFFIDAVIT OF STEVE H. HANKE

1. My name is Steve H. Hanke. I am a Professor of Applied Economics at the Johns Hopkins University in Baltimore, where I teach courses and conduct research on futures markets. I am also a Principal of Chicago Partners, LLC, an economic consulting firm that specializes in complex litigations. I also have extensive experience trading in currency, commodity, fixed income and futures markets. My *curriculum vita* is attached as Exhibit A.

2. I have been asked by counsel for Pacific Investment Management Company LLC (PIMCO) to submit this Affidavit to address economic issues raised by plaintiffs' motion for class certification in the above-captioned action.

3. Section I considers the economics of the Treasury market. In Section II, I summarize plaintiffs' allegations and argue that the methodology proposed by Professor Gilbert does not enable a simple 'search for the truth'. Factors that prevent determination of injury on a class-wide basis are covered in Section III, and circumstances that will produce conflicts of interest are taken up in Section IV. Section V concludes.

I. The Economics of the Treasury Market

4. I divide the Treasury market into the *spot market*, the *futures market*, and the *repo market*. Although this is not an exhaustive classification, or the most fine-grained classification possible, it covers the features of the Treasury market that are most salient in the current matter. Next I consider how the spot, futures, and repo markets interact and describe *market equilibrium*. Lastly, I consider some of the major *informational and expectational factors* that drive prices in the Treasury market.

The Spot Market

5. The United States Treasury makes regular offerings of *bills* with maturities of 4, 13, and 26 weeks (1, 3, and 6 months).[1] Treasury bills pay no coupons, and are therefore sold at a discount. The yield on Treasury bills is implied by the size of the discount. The Treasury also offers *notes* with maturities of 2, 3, 5, and 10 years, and *bonds* with maturities of 30 years. Each of these pays coupons every six months (semiannually). Finally, the Treasury issues Inflation-Protected Securities (TIPS) in which the principal and coupons are indexed to Consumer Price Index inflation. They are issued in terms of 5, 10, and 20 years. Trading for immediate delivery in these securities taken together defines the *spot market* for Treasury securities.

[1] The lifetime of a bill, note, or bond, from issue to full repayment, is called its maturity.

6. Treasury securities are considered default-risk-free by market participants. All Treasury securities are backed by the full faith and credit of the United States government. The United States government can always meet its obligations because it always has the option to print the money if it needs to do so. This default-risk-free feature of the Treasury market allows Treasury prices and yields to serve as benchmarks for the pricing of other debt securities.

7. In addition to its default-risk-free status, the Treasury market is unique because of the unique place the dollar holds in the international financial system. The primacy of the dollar in the international economy has allowed the Treasury market to become the largest and most liquid bond market in the world. Accounting standards used by banks and pension funds recognize these unique circumstances by treating Treasury securities as risk-free assets, increasing their desirability. There is also a tax advantage to holding Treasury securities, since gains and losses on Treasury investments are not taxed at the state level. For these reasons (no credit risk, liquidity, preferential tax treatment) and others, there is somewhat of a structural excess demand for Treasury securities.[2]

8. It is the practice of the Treasury to follow a 'regular and predictable' issuance policy. This means that Treasury auctions are held on a periodic schedule with a view to the long-term financing needs of the government rather than the short-run needs of the secondary Treasury market. A new issue of the 10-year Treasury note, for example, is generally auctioned every three months, in February, May, August and November of each year.

9. Despite its 'regular and predictable' policy, Treasury sometimes departs from making regular issues. As the policy of the government during the late 1990s was gradually to retire public debt, the regular auction schedule was interrupted. Only three new 10-year Treasury notes were auctioned in 1997 and 1998, a mere two each in 1999, 2000, and 2001, and only three in 2002.[3] The Treasury also stopped auctioning new 30-year bonds after August 9, 2001.[4]

10. The dynamics of the spot Treasury market have been impacted by new participants. The impact of hedge funds has gained much attention in the press. More recently and perhaps more importantly, foreign central banks have also become large

---

[2] 'Structural' does not imply 'static', however. World demand for Treasury securities changes for many reasons, but it has tended to exceed the supply of Treasury securities, making for a structural excess demand. This may be seen easily in the regular oversubscription of Treasury auctions (an excess of bids relative to the offering).

[3] Here I am only concerned with nominal Treasury notes (i.e., excluding TIPS).

[4] In August 2005 the Treasury announced it would reintroduce the 30-year bond with an auction on February 9, 2006.

participants in the spot Treasury market. Since the many emerging market financial crises of the late 1990s, foreign central banks have been interested in increasing their holdings of foreign reserves and stabilizing their exchange rates against the US dollar. Purchases of Treasury notes and bonds have helped central banks meet both of these objectives. Central banks tend to favor longer-maturity notes and bonds to reduce the opportunity cost of their reserve holdings.

The Futures Market

11. Futures on 2, 5, and 10 year Treasury notes and 30 year Treasury bonds are traded on the Chicago Board of Trade (CBOT), and futures on the 13-week Treasury bill are also traded on the Chicago Mercantile Exchange. A Treasury futures contract commits a market participant to purchasing or selling a Treasury note or bond at a specific future date (the 'maturity' or 'delivery' date). The CBOT offers standardized Treasury futures contracts to increase market liquidity, ensure transparency, and allow negotiations to focus on price alone. It also makes arrangements with clearinghouses and uses other punitive mechanisms to ensure that traders' obligations are settled.[5]

12. For every participant agreeing to purchase a Treasury security in the future (a 'long' in market parlance), there must be another participant agreeing to sell (a 'short'). If there is an excess of longs, prices will rise until shorts can be attracted into the market. Likewise, an excess of shorts will cause prices to fall. The total number of long-short pairs in a futures market is called the open interest. The level to which open interest may grow is limited, therefore, by the willingness of market participants to contract for future purchase or sale at (roughly) the prevailing market price.

13. CBOT Treasury futures contracts allow for delivery of several issues of Treasury notes and bonds in fulfillment of contract obligations. The set of notes or bonds eligible for delivery is called the deliverable basket. For the 10-year Treasury note future, the deliverable basket includes all Treasury notes with 6.5 to 10 years remaining until maturity. The CBOT uses conversion factors to make the various issues of notes in the deliverable basket roughly equivalent for delivery. To compute the conversion factors, the CBOT values the notes in the deliverable basket at a common interest rate fixed by the contract provisions, and rounds the time remaining to maturity down to the nearest quarter.

14. The CBOT's conversion factors fail to provide completely equal values for the notes in the deliverable basket. When market interest rates are below the interest rate in the contract provisions, notes with higher coupons and shorter times to maturity (lower

[5] The CBOT may level penalties of up to $25,000 plus $25,000 per contract (one quarter of the nominal contract value), making failure in delivery a very costly decision.

'durations') become cheapest-to-deliver.[6] It is easy to see, therefore, that the existence of a cheapest-to-deliver note is an artifact of the CBOT futures contract specification rather than a natural economic outcome.

15. Discrepancies in the valuation of deliverable notes or bonds can become quite pronounced when the Treasury's regular issuance schedule has been interrupted. If, following the example above, the cheapest-to-deliver note is the note in the deliverable basket with the shortest duration, the next-cheapest will be the note with the next-shortest duration. If the Treasury has been issuing debt at regular intervals, the next-shortest duration will have three more months to maturity than the cheapest-to-deliver note, and the difference in the cost of delivering them will be small. If, however, the Treasury has missed one of its regular issues, the difference in the cost of delivering the cheapest-to-deliver and the next-cheapest will be considerably larger. Again, this is not a natural economic outcome, but a combination of CBOT conversion conventions and Treasury debt management practices.

16. It is often asserted that delivery is exceedingly rare in futures trading. But, as a leading scholar of futures markets observes, "deliveries are far more common on futures contracts than anyone has supposed, whether in terms of their absolute number or in proportion to the size of the market."[7] For example, it was found that the world's entire stock of gold turns over three times each year due to deliveries on futures contracts. If one measures delivery relative to the peak open interest in the futures contract, or relative to the stock of the deliverable asset, large deliveries are not unprecedented on Treasury note futures.

The Repo Market

17. Participants in the Treasury market often finance their spot market positions through *repurchase agreements*, known colloquially as *repos*. In a repurchase agreement, one party (the security seller) sells the bond to the other party (the buyer) at a price at or near the current spot price for the same bond. The buyer remits cash to the seller for the bond. At the same time, the seller commits to repurchase the same bond from the buyer

---

[6] John C. Hull, *Options, Futures and Other Derivatives*, 6th ed. (Upper Saddle River, NJ: Prentice Hall, 2006), p. 135. "Also, when the yield curve is upward-sloping, there is a tendency for bonds [or notes] with a long time to maturity to be favored, whereas when it is downward-sloping, there is a tendency for bonds [or notes] with a short time to maturity to be delivered." Duration refers to the amount of time remaining until the final cash flow is received.

[7] Jeffrey C. Williams, *Manipulation on Trial* (Cambridge: Cambridge University Press, 1995), 166, citing Anne Peck and Jeffrey C. Williams, "Deliveries on Chicago Board of Trade Wheat, Corn, and Soybeans Futures Contracts, 1964/65-1988/89," *Food Research Institute Studies* 22: 129-225 (1991).

for cash on a later date. This kind of traditional repo can be viewed as a parallel loan in which the bond seller lends the bond to the buyer, who in turn lends the bond seller cash. The difference between the price at which the bond is repurchased later and sold initially is the repo rate or the interest rate on the loan secured by the bond. From the point of view of the bond buyer, this transaction is called a *reverse repo*. Hence, every repo transaction has a reverse repo counterpart.

18. A trader who seeks to finance a long spot Treasury position is the seller of a repo, whereas the buyer (the reverse repo party) is someone seeking to finance a short spot position. The repo party is long because he will be purchasing the Treasury security in the future, whereas the reverse repo party is short because he will be selling the security in the future. Bond traders engage in various forms of yield curve arbitrage (simultaneously buying and selling Treasury securities of different maturities) by acquiring long and short positions in this way in the repo market.

19. Repos are often negotiated on an *overnight* basis, meaning that repurchase of the security occurs the day after purchase by the reverse repo. However, it is typical for parties to a repo agreement to renegotiate an overnight repo from day to day to extend the agreement indefinitely. Because of the convention of not compounding interest in the repo market, renegotiating an overnight repo from day to day connotes the same financing cost as agreeing to a repo over several days, which is known as a *term repo*. In a sense, term repos bridge the spot and futures markets.

20. The difference between the amount of cash paid to repurchase the bond at the end of the repurchase agreement and the amount of cash lent at the beginning of the repurchase agreement may be converted into an annualized interest rate known as the *repo rate*. The repo rate tends to be roughly the same for Treasury securities of all maturities, and so the repo rate is often referred to as the general collateral rate. The repo rate is usually roughly equal to the federal funds rate, as most dealers who have access to the repo market for their financing needs can easily substitute for their needs in the interbank market, which clears at roughly the federal funds rate when monetary policy objectives are being met.[8] Accordingly, the repo rate is the *cost of finance* for bond market participants.

21. When a particular Treasury security is in high demand, it often trades *special* in the repo market. That a security is on special indicates that its repo rate is below the

---

[8] Actually, it tends to be slightly lower. "The overnight repo rate normally lies slightly below the Fed funds rate for two reasons. First a repo transaction is in essence a secured loan, whereas the sale of Fed funds is an unsecured loan. Second, many investors—corporations, state and local governments, and others—who can invest in repo cannot sell Fed funds." Marcia Stigum, *The Money Market*, 3rd ed. (Homewood, IL: Dow Jones-Irwin, 1990), p. 585.

general collateral rate. It is common for the most recently issued Treasury security of any maturity (the 'on-the-run' security) to trade special, as well as any other particular security which is in particularly high demand, such as a bond that is cheapest-to-deliver on a futures contract by a wide margin. Increased demand from short-sellers, who need to borrow the security to establish their short position, is usually the source of pressure leading a security to trade special in the repo market. A bond trading special thereby indicates that there is a *convenience yield* to holding the bond.

22. Certain institutional features prevent the repo rate on any security from going below zero, although negative repo rates are occasionally observed in situations of extreme distress. Thus the amount by which a security may trade special in the repo market is bounded by the general collateral rate, which is roughly the federal funds rate. When the federal funds rate is very low, the degree to which a security may become special will be very low as well.[9]

23. When the reverse repo party to the transaction (i.e., the one who lends money to purchase the security) does not deliver the security at the end of the repo agreement, he is said to 'fail.' If the party fails, delivery is rescheduled for the following day at the same price. In instances where the security to be delivered is trading at a specials rate near zero, the party would then be indifferent between failing and undertaking another reverse repo to obtain the security for delivery.[10]

---

[9] This was illustrated starkly in 2003. The general collateral rate was at roughly 1.25% until late June, and at 1% thereafter, as the Federal Reserve reached the peak of its post 9/11 monetary policy easing. With virtually no room for maneuver in the repo market, increased demand for short-selling in the 10-year Treasury market caused the 3.625% Treasury Note of 5/15/2013 to trade special at a zero rate from June through November 2003. For a time in August, specials rates went below zero. Michael J. Fleming and Kenneth D. Garbade, "Repurchase Agreements with Negative Interest Rates," *Federal Reserve Bank of New York Current Issues in Economics and Finance*, 10(5), April 2004, pp. 3-4. The interaction of monetary policy and repo market fails has caused regulatory consternation. Randal Quarles, Under-secretary of the Treasury for Domestic Finance, observed "we might expect that the incidence of very low nominal interest rates and the associated potential for systemic fails episodes could be somewhat higher in the years ahead." US Treasury press release JS-4274, May 19, 2006.

[10] Fleming and Garbade, "Repurchase Agreements with Negative Interest Rates," p. 3. In connection with the events of late 2003, they note, "Demand to borrow the ten-year note remained strong and the specials rate for the note remained at zero. The persistence of the specials rate at zero left sellers with little economic incentive to borrow the note to cure their settlement fails. In late July, one market participant commented, 'the issue...has totally stopped clearing.'"

24. The convenience yield for holding a given security is not constrained in the same way special rates are, since it is an expression of how costly traders view a potential inventory stock-out (i.e., not having the security on hand) to be. As a result, the convenience yield on a security may come to exceed the amount by which the security can trade special. This is well understood in the repo market. Hence, fails are understood as a legitimate economic decision made by the reverse repo party. Unlike in the futures market, therefore, a dealer in the repo market can fail on a repo without adverse consequences for his reputation or additional monetary penalties.[11] Perhaps unsurprisingly, fails are a common occurrence in the repo market, and especially so in economic environments characterized by low interest rates (loose monetary policy) and a small stock of Treasury securities relative to spot and futures trading.

25. When a Treasury security trades special, any market participant who is currently holding that security has the opportunity to obtain financing at below-market rates by offering the security on repo. In this way, market forces act to call forth the available supply of the security. Nevertheless, the degree to which these forces can act is constrained by (a) the stance of monetary policy, (b) the convenience yield of holding the security in inventory, and (c) regulations which prohibit certain Treasury market participants (e.g., state pension funds) from lending Treasury securities on repo.

26. Since there is a gain to be had from holding a Treasury security that is likely to trade special, securities that are expected to eventually trade special – that is, securities that are expected to be in high demand – trade at a premium to similar securities. This occurs because market participants are willing to bid the usual market price plus the expected return from the security going on special.[12]

Equilibrium in the Treasury Market

27. Spot and futures prices are related to each other by the cost of carry model, which posits that the time t price for delivery at time T is equal to the spot price times one plus the cost of carry from time t to time T. This relationship is the most fundamental relationship in futures markets, and reflects that futures markets have the function of allocating inventories in time.

28. When delivery of a number of grades of the spot market asset is possible in a futures contract, the cost of carry relation will determine the futures price as a

---

[11] Fails cannot go on indefinitely, since regulatory rules require dealers to hold extra capital for aged fails, which impose an opportunity cost on the dealer. *Ibid.*, p. 4.

[12] Darrell Duffie, "Special Repo Rates," *Journal of Finance* 51: 493-526 (1996). The amount of this premium is measured and found to be statistically significant in Bradford D. Jordan and Susan D. Jordan, "Special Repo Rates: An Empirical Analysis," *Journal of Finance* 52: 2051-72 (1997).

probability-weighted average of the deliverable spot market assets and their respective costs of carry. Accordingly, Treasury futures prices will reflect the possibility of delivery of multiple issues from the deliverable basket. The choice of which issue to deliver is a non-negative-valued quality option available to the short.[13]

29. The cost of carry may be decomposed into the financing cost, the physical storage cost, the convenience yield (a negative cost), and the dividend yield (a negative cost). We have seen above that the financing cost in the Treasury market is given by the repo rate (¶20), and that the convenience yield is greater than or equal to the amount by which a security trades special (¶21, 24). Since Treasury securities are transferred electronically from dealer to dealer and reside as certificates in vaults, physical storage costs (including transportation) are negligible. Finally, the dividend yield reflects the coupons and accrued interest earned by the holder of the Treasury security.

30. The spot price, futures price, repo rate, and special rate are *simultaneously determined*. Changes in the spot price do not 'cause' changes in the futures price any more than changes in the repo rate 'cause' changes in the spot price. All of the variables are determined based on changes in the *term structure of interest rates*.

31. The real term structure of interest rates may be thought of as the pure price of time, or more technically, the rate of time preference for consumption. The rate of time preference for consumption represents the amount by which people demand to be compensated for postponing consumption.[14] The term structure of interest rates, therefore, depends on market expectations for the allocation of consumption in time, which in turn depend on the level of economic activity and institutions that regulate the level of economic activity, such as the Federal Reserve (see ¶36 and footnote below). Economists are interested in the term structure not only for what it suggests about intertemporal consumption, but also for the theoretical pricing of bonds.[15] The *nominal* term structure of interest rates is the pure price of time *plus* expected inflation.

32. We can now define equilibrium for the Treasury market. Equilibrium in the Treasury market implies that the relationship between spot, futures, and repo markets

---

[13] Michael L. Hemler, "The Quality Delivery Option in Treasury Futures Contracts," *Journal of Finance* 45: 1565-86 (1990).

[14] The full term structure of interest rates gives a schedule of rates of compensation for deferring consumption for any length of time into the future. Generally, people demand to be compensated more for postponing consumption a longer time, so the term structure is usually upward-sloping.

[15] Economists discount the coupons and principal payable on Treasury securities by the relevant zero-coupon bond yield to obtain the appropriate net present value for the Treasury security. Once this is done, one can compute the corresponding yield on the Treasury security.

described by the cost-of-carry model holds for Treasury securities of all maturities. These relationships must also be consistent with a single term structure of interest rates.

33. Equilibrium in the Treasury market implies a number of price relationships that may be considered separately. Economists call the prices of currently-traded futures contracts the *forward curve* when they are ordered by their delivery dates. The forward curve must be consistent with prevailing repo rates and the prices of the notes and bonds in the respective deliverable baskets. Deliverable notes and bonds are related to each other by the *yield curve*, which is the set of interest rates on Treasury securities ordered by their time to maturity. Accordingly, a change in one price can affect many prices in the Treasury market simultaneously.

34. Note finally that special repo rates of zero percent and a high number of repo market failures can be completely consistent with equilibrium in the Treasury market. It can also be shown that no welfare-improving equilibrium exists for the repo market, even when equilibrium entails special repo rates of zero.[16]

Information and Expectations in the Treasury Market

35. Economists also recognize the informational efficiency of the Treasury market, which means that all information that would affect Treasury prices and yields is incorporated into Treasury prices and yields.[17] Some basic variables that most economists agree will affect Treasury prices and yields are the stance of monetary policy, inflation, and the evolution of public and private consumption in time.

36. Treasury market participants focus above all on the stated and unstated policies of the Federal Reserve.[18] The Federal Reserve seeks to control the rate of

---

[16] Duffie, "Special Repo Rates," pp. 509-12. The satisfaction of this condition, which economists call Pareto optimality, is the touchstone of economic welfare analysis. If Pareto optimality obtains, economists recognize the allocational efficiency of the market – i.e., that it is functioning normally, as desired, and as well as possible.

[17] See, for example, Bruce G. Resnick and Elizabeth Henniger, "The Relationship Between Futures and Cash Prices for U.S. Treasury Bonds," in Anne E. Peck, *Selected Writings on Futures Markets: Explorations in Financial Futures Markets* (Chicago: Chicago Board of Trade, 1985), 367-84; and Michael J. Fleming and Eli M. Remolona, "Price Formation and Liquidity in the U.S. Treasury Market: The Response to Public Information," *Journal of Finance* 54: 1901-15 (1999).

[18] Martha Stigum's chapter on the Federal Reserve in her book *The Money Market* is called "THE MOST WATCHED PLAYER: THE FED." Some recent headlines from the *Wall Street Journal*'s regular Credit Markets column also bear this out: "Bond Prices Ease amid Tough Inflation Talk (6/8)," "Fed Expectations Lift 10-Year Yield (6/23)," "Bond Market Awaits Rate Decision (6/26)," "Treasuries Gain after Fed Statement (6/30),"

inflation by adjusting the federal funds rate and its discount rate, and by making large-scale purchases and sales of Treasury notes and bonds in the spot and repo markets. One might even say that the Federal Reserve is responsible for manipulating the Treasury market in a manner consistent with its policy objectives.

37. Market participants also concentrate on the likely evolution of the government budget and the debt management policies of the United States Treasury. A series of government deficits implies more debt issuance (an increase in supply), whereas a series of surpluses implies retirement of debt (a decrease in supply). Some key factors clearly include tax policy and gross collections, the direction of planned expenditures, and the growth rate of incomes and capital gains – essentially, the growth rate of the national economy.

38. Treasury market participants use more or less sophisticated models of the Treasury market to draw inferences from available market information. These can range from simple rules of thumb or hunches, to complicated computer programs processing billions of data points. No one model of the market is correct, and the only reason for a market participant to prefer one to the other is whether the model helps him make profitable trades.[19]

39. Occasionally a shift occurs in the Treasury market that is so fundamental that models developed based on previous outcomes no longer do a good job of forecasting changes in the market. Such shifts might include the introduction of new regulations, an unexpected monetary policy intervention, or the announcement of a new monetary policy regime. These events require a wholesale revision of expectations. Market participants may bet on their conjectures of such shifts, but not in line with any sort of statistical market model.

II. Summary of Plaintiffs' Injury Theory and Methodology Proposed by Plaintiffs' Expert Professor Gilbert

40. Plaintiffs allege that the prices of the June 2005 10-year Treasury note future and the February 2012 Treasury note were 'manipulated' to an artificially high level. Plaintiffs assert that this 'manipulation' is connected with PIMCO's purchase of "an extraordinarily large long position" in the June 2005 futures contract, and a "highly

---

"Traders Seek Signs Fed Has Finished Raising Rates (7/3)." It is fairly surprising to me, therefore, that neither Professor Gilbert nor Thomas Rubio believe Federal Reserve announcements are important for the Treasury market.

[19] Although it is basically saying the same thing, traders also like their models to be relatively simple (so they produce unambiguous trading signals) and undemanding in terms of computational resources (so they respond quickly to new information). See ¶65 below for additional considerations related to market models.

unusual" purchase of a large portion of the February 2012 note issue between March 31 and June 30, 2005. PIMCO is also connected with this 'manipulation' for having "engaged in the highly unusual conduct of not commensurately (or at all) liquidating its extraordinary June contract long positions" and instead "[taking] unusually large deliveries." I will refer to this theory hereafter as the Alleged Manipulation.[20]

41. Plaintiffs propose a class of persons injured by the Alleged Manipulation including "All persons who purchased, between [May 9, 2005] and June 30, 2005 ('Class Period'), inclusive, a June 10-year Treasury note futures contract in order to liquidate a short position, or who delivered on the June 2005 futures contract in order to satisfy a short position (the 'Class')."[21]

42. Plaintiffs' expert Professor Gilbert proposes to prepare "calculations of the artificiality both of the February [2012] note and the June [2005] future ... on every day of the class [period]."[22] Accordingly, he acknowledges price artificiality, to the extent that it existed during the Alleged Manipulation, could change from day to day.[23]

43. Professor Gilbert correctly acknowledges that in constructing a statistical model to identify and quantify artificiality in prices "there will always be a lot of assumptions."[24] Some important assumptions that must enter Professor Gilbert's model include (a) the choice of 'correctly'-priced notes and futures contracts for comparison to

---

[20] Defendant PIMCO's Memorandum in Support of Motion to Dismiss, February 2, 2002, pp. 5-7.

[21] Plaintiffs' Memorandum in Support of Motion for Class Certification, February 16, 2006, p. 1.

[22] Deposition of Christopher Leslie Gilbert, June 28, 2006, p. 193. (Hereafter 'Gilbert deposition.')

[23] In fact, he acknowledges that artificiality would change from minute to minute: "Q. Isn't it true that if there were an artificiality of price ... it could fluctuate every minute ...? A. That is also true...." Gilbert deposition, p. 194.

[24] Gilbert deposition, p. 98. Professor Gilbert's testimony on assumptions is somewhat difficult to pin down because he speaks of assumptions that operate at two different levels. He goes on to testify, in the section I have quoted from, that "any good analyst ... would ensure as well that his assumptions were tested and could be defended against other sets of assumptions." (p. 98) But at this point he is speaking only of assumptions that validate *regression as a methodology*, so he gives examples of conditions that make OLS regression efficient (no multicollinearity; a residual distributed with mean zero and constant variance). This is not the same as validating a *regression model*, which requires a number of (not necessarily testable) additional assumptions on which professional economists can strongly disagree. A *regression model* is what Professor Gilbert actually requires to draw the conclusions he wishes to draw. It is thus at the modeling level that I direct my examination of Professor Gilbert's assumptions.

prices observed during the Alleged Manipulation; (b) the choice of a time frame in which the chosen notes and futures contracts were 'correctly' priced for purposes of calibrating the model; (c) the choice of variables to predict 'correct' prices in the regression model; (d) the choice of relevant variables for explaining the departure of prices from their 'correct' level; (e) the choice of a counterfactual assumption for simulating a series of 'correct' prices but for the Alleged Manipulation; and (f) the choice of the appropriate time-step to apply in the model. Each choice can have a material effect on the determination of injury, leading to confusion about who is injured in the proposed class. Each choice will also impact the allocation of damages among proposed class members, leading to conflicts of interest.

Assumptions to be Made by Professor Gilbert

44. In order to determine the extent of anomalous behavior in the June 2005 10-year Treasury note future, Professor Gilbert must compare its price behavior to other futures contracts. However, "the extent of anomalous behavior in the June contract in part depends upon what one takes as the comparator. And one would certainly wish to take a normal contract as a comparator."[25] His initial perusal of the data bears this out, as he notes, "the comparison between the June and the September futures contract... didn't give necessarily the same clear story as the comparison between June and March or June and December...." For now, Professor Gilbert offers the following provisional analysis: "I think the relevant comparisons are between June and Sep and June and Dec, and one would need to determine [if] those [are] appropriate comparators. If that were not possible, then that methodology would not be available...."[26]

45. Professor Gilbert will also have to make comparisons to other Treasury notes to determine the artificiality present in the February 2012 note. He has also had an initial look at these data, but when "looking at mispricing in the bond market, I was clearly interested in possible mispricing of the February 2012 note, but it wasn't immediately clear to me that other notes were not also mispriced...."[27]

46. Professor Gilbert indicates that he would like to examine "Prices of 10 year Treasury notes and CBOT Treasury note futures over the class period and for the five years immediately prior to the start of the class period, volumes and open interest on the CBOT Treasury note futures market over the same periods, and the deliveries on

---

[25] Gilbert deposition, p. 18. Professor Gilbert explains that this comparison is both necessary ("Necessarily one compares one futures contract with other futures contracts.") and incomplete ("Q. Do you have a normal contract you've identified? A. I have not done enough work to make such a characterization."). (pp. 18-19)

[26] Gilbert deposition, p. 158.

[27] Gilbert deposition, p. 63.

futures contracts over this period."[28] The five year preceding period is intended for his methodology as an interval in which Treasury note and Treasury note futures prices were untainted by the Alleged Manipulation. Other choices could be made, however, as Professor Gilbert acknowledges. "Five years is an arbitrary period. ... So there is no particular significance to five and it could have been four, three, six, seven without any notable difference."[29] It *is* an arbitrary period, but the choice of period length *is* particularly significant because the period will potentially overlap many monetary policy regimes, across which the term structures of interest rates are *not* comparable.[30]

47. Professor Gilbert freely admits "I have not proposed a specific model. I have proposed a modeling methodology at this stage."[31] This means that he has not yet chosen which variables he would use in his model to predict 'correct' prices for the June future and the February 2012 note. As he says, "I was careful to leave things open not because in any sense I want to hide ... but because until I've proceeded further with the analysis, I would not wish to commit."[32]

48. After choosing variables to predict the 'correct' level of prices, variables must be chosen to explain the departure of prices from their 'correct' level, because "to regard any discrepancy of a yield from the yield curve [as artificial] would clearly not be correct. It follows that ascribing the whole of such a discrepancy to Defendants' manipulative behavior would also not be correct."[33] Hence variables that describe PIMCO's behavior, as well as other variables, must be chosen to explain the anomalous prices.

49. Provided that Professor Gilbert can settle on variables to describe the departure of prices from their 'correct' level, he will then predict price patterns but-for PIMCO's behavior using "a counterfactual simulation, the counterfactual being that the alleged manipulative behavior did not take place."[34] But, as with other decisions, "I'm a

---

[28] Affirmation of Professor Christopher L. Gilbert, February 16, 2006, ¶11(e).

[29] Gilbert deposition, p. 210.

[30] Professor Gilbert seems to acknowledge this indirectly. "Markets change over time ... so the more distant past is less relevant than the more recent past." (137-39)

It is also important to point out that these considerations do not, in any sense, 'average out' for the choice of a sufficiently long period.

[31] Gilbert deposition, p. 104.

[32] Gilbert deposition, p. 96.

[33] Gilbert deposition, p. 85.

[34] Gilbert deposition, p. 83.

little wary of committing too much on how I would do that...."[35] Professor Gilbert also acknowledges that economists could disagree on the proper counterfactual to apply.[36]

50. Finally, no matter what form Professor Gilbert's model takes, he must decide how frequently he will predict 'correct' prices, which directly determines the frequency of data he will require to calibrate his model. As stated above, Professor Gilbert indicates that "the methodology I have proposed ... is not susceptible to dealing with ... changes on an intra-day basis in artificiality. I conjecture that it could be possible to elaborate the methodology to account for that. ... The reason I am suggesting doing this on a daily basis is because anything else would require a large amount of work rather than because it's impossible."[37] But passing over intra-day changes will result in materially different determinations of injury and calculations of damages, since intra-day fluctuations are large enough to turn a winning trade opened and closed at daily settlement prices into a losing trade opened and closed at intra-day prices, and vice-versa, on the same dates. It would also make determination of injury in short day trades either impossible or a matter of faith.

'Search for the Truth' or Ad-Hoc Prospecting?

51. Clearly, Professor Gilbert must make a vast number of econometric modeling decisions to perform his analysis. His findings will inevitably be driven by his assumptions, and as I will argue below, representatives of the proposed class and proposed class members could strenuously disagree as to which assumptions Professor Gilbert ought to apply. These latent conflicts of interest frustrate an objective 'search for the truth' in the current matter, suggesting that *the presumed existence of methods common to all proposed class members for identifying injury cannot trump the fact that injury cannot be demonstrated from the outset for all proposed class members.*

III. Individual Circumstances Must be Considered to Determine Injury

Variability of Artificiality Prevents Determination of Injury

52. Professor Gilbert readily concedes that the proposed class definition may include parties who were not injured by the Alleged Manipulation, and that one would

---

[35] Gilbert deposition, p. 84.

[36] "Q. ... You have certain counterfactual inputs into your model and couldn't professionally acting economists disagree on which counterfactual inputs ought to be made? A. That's certainly the case...." Gilbert deposition, p. 101.

[37] Gilbert deposition, pp. 194-95.

have to consider the particular transactions of those parties to make an injury determination.[38] This is a point on which we agree.

53. We agree on this point because I also would agree that if the Alleged Manipulation created artificial prices, the degree of artificiality would vary from day to day and from minute to minute. The variability of the Alleged Manipulation can easily convert losing trades into profitable trades (or reduce the amount lost), if greater artificiality prevails at the time of the sale than at the time of purchase. It may then turn out that proposed class members are beneficiaries of the Alleged Manipulation rather than victims. Similarly, if the degree of artificiality is equal at initiation and closeout, there is no net effect. But we do not know whether these conditions hold until the analysis has been conducted. Accordingly, injured parties cannot be identified prior to analysis. Rather, the timing of each individual's trades, combined with a choice of modeling assumptions by Professor Gilbert, will determine whether he or she was injured.[39]

The Effects of the Alleged Manipulation on other Interest-Rate Instruments[40] Introduce Individual Considerations in the Determination of Injury

54. As I suggested in ¶35 above, the impact of the Alleged Manipulation would have been transmitted to other Treasury cash securities and Treasury futures through relationships between bonds on the yield curve and between futures contracts on the forward curve.[41] Benefits realized from holding other spot or futures positions may well

---

[38] Gilbert deposition, pp. 183. "Q. Now, if you assume that there was a[ ] manipulation here, there would be parties within this class definition who would not have been injured by the manipulation, wouldn't there? ... A. Well, I don't know that. It's possible that there were. Q. And in order to determine that, you would have to look at the particular transactions of those people; is that right? A. That's right. Yes."

[39] This is also to say that I do not agree with the Plaintiffs that artificially high prices *caused* losses to plaintiffs, if any. Corrected Consolidated Amended Class Action Complaint, December 29, 2005, ¶21.

[40] I use interest-rate instruments to refer to Treasury securities in the spot and futures markets.

[41] Although no ready term of art exists, these notions can also be combined to produce a "forward yield curve" of futures on different underlying maturities of Treasury securities for delivery on the same date.

I do not agree with Professor Gilbert that these linkages are trivial, as he says on pp. 151-55 of his deposition. If investors begin to substitute away from a note they consider to be abnormally priced, they will prefer to move to the *closest* substitute, rather than just any Treasury security. For most investors' purposes, the closest substitute is the note that is closest in duration (or maturity). As a result, any abnormality would spread disproportionately to adjacent notes on the yield curve.

offset injuries from shorting the June 2005 future. One would have to consider each potential class member's trades in all interest-rate instruments, then, to determine whether injury occurred in the Alleged Manipulation.

55. Consider three common examples of how this linkage of prices works. First, one must consider whether those who rolled into more distant contract months from a short June 2005 position were injured, ultimately, when their futures position was closed out.[42] Secondly, one must consider whether those who were short June 2005 10-year Treasury futures and who held Treasury notes in the deliverable basket at the same time (basis traders) were injured on net. Thirdly, a number of yield curve strategies exist in which a trader may profit by selling short a June 2005 10-year Treasury future and going long other June 2005 Treasury futures (e.g., the 2-year note, 5-year note, or 30-year bond futures). As I show below, the two lead plaintiffs and two potential class members each have individual considerations in this regard.

56. Both Richard Hershey[43] and Josef Kohen[44] engage in rolling during the proposed class period. Josef Kohen carries a short position of three contracts into the proposed class period and maintains this position until June, with the exception of a brief trade on May 24-25, which I discuss in ¶66 and ¶68 below. At the beginning of June, Kohen rolls his June 2005 contracts into September 2005 contracts, keeping his short position open. Kohen explains that the purpose of rolling was to maintain his investment thesis that interest rates would increase.[45] Accordingly, to decide whether Kohen was injured on his investment, one would need to measure the degree of artificiality in the September 2005 future due to the Alleged Manipulation in July and September when he closed his short position.

57. Richard Hershey carried a long June 2005 futures position from May 11 to May 27, at which time he rolled into a long September 2005 contract. To determine whether he was injured on this trade, as he claims he was[46], one would need to measure the degree of artificiality in the September 2005 future due to the Alleged Manipulation on July 5 when he closed his long position.

---

[42] 'Rolling' entails moving to a different delivery date (or contract month) for a future on the same underlying asset, while maintaining the same long or short position.

[43] Although I refer throughout to Richard Hershey as the holder of the account and the agent trading his account, this is merely shorthand for the Waxman/Hershey account, which is traded without intervention by either principal of the account.

[44] As with Hershey, Josef Kohen is shorthand for the joint Kohen account.

[45] Deposition of Josef Kohen, May 8, 2006, p. 104. (Hereafter 'Kohen deposition.')

[46] Deposition of Richard Hershey, May 9, 2006, pp. 87-88. (Hereafter 'Hershey deposition.')

58.

REDACTED

59. Finally, [redacted] would be a member of the class proposed by plaintiffs, as

REDACTED

Furthermore, the plaintiffs' theory relies on a large player in the market withholding a large portion of the cheapest-to-deliver note supply. Plainly, [redacted] would be a cause of such a shortage in the cheapest-to-deliver note, despite being a member of the proposed class.

60. It would be tempting to conclude that a 'search for the truth' would handle this state of affairs by arriving at clean prices for all interest-rate instruments, and then determining whether market participants were injured. However, a global re-pricing of this sort is beyond the resources of responsible econometricians like Professor Gilbert, because there would be no spot or futures securities on which to base a comparison (i.e., there would be no degrees of freedom for the estimation). To put it another way, any such estimates would be unconstrained by reference to other market prices. These comparisons usually provide a first check of the consistency of the estimates, and ensure that the levels predicted are reasonable.

47

REDACTED

Not All Shorts Remain Shorts

61. It is likely that several members of the proposed class will have been on both sides of the futures market during the proposed class period, like Richard Hershey was. Hershey entered the proposed class period short one June 10-year Treasury future, closing his position on May 11. On the same day, he went long one June 10-year Treasury future, a position which he rolled into the September 10-year Treasury future on May 27. He continued to hold this long position until July 5. If the Alleged Manipulation increased prices, Hershey likely benefited from the Alleged Manipulation more than he lost.

Not All Losses Come From the Alleged Manipulation

62. REDACTED These losses may be attributed in large part to a major realignment of market expectations due to the Federal Open Market Committee's release of its May 3 meeting minutes at 2:00 PM on May 24.

63. The FOMC voted to raise its target for the federal funds rate by 25 basis points to 3 percent at its May 3 meeting. Treasury market participants anticipated an eventual increase in interest rates to 3.75 or 4 percent, and bought and sold Treasury securities in the market on this assumption. Following the release of the FOMC minutes on May 24, market participants interpreted the minutes to mean that additional rate increases were less likely. This change in expectations justified paying higher prices for Treasury notes and Treasury futures, so prices on both went up.[49]

64. REDACTED

[49] See, for example, Michael McDonald, "Bond Strategists: Morgan Stanley's Berner Says Sell Treasuries," *Bloomberg News*, May 24, 2005; idem, "Credit Suisse First Boston's Konstam Comments on Fed, Bonds," *Bloomberg News*, May 24, 2005; and Rodrigo Davies, "Bond Strategists: Merrill Lowers 10-Year Treasury Yield Call," *Bloomberg News*, May 25, 2005.

[50] May_June refsecmn_offset_trades.xls

Other Individual Considerations

65. [redacted] Richard Hershey used market models[51] to formulate their trading strategies. These models reacted to conditions prevailing in the market at the time of the Alleged Manipulation. A full application of the counterfactual assumption (i.e., eliminating the Alleged Manipulation) would thus require reformulating trading strategies for [redacted] Hershey by re-running their market models with the 'correct' prices generated by Professor Gilbert. In other words, one cannot even take the lead plaintiffs' trading patterns as given for purposes of determining injury, and each of their models will have to be considered separately.

66. Even something as innocuous as an accounting convention can make the difference between injury and non-injury in the proposed class period. This is illustrated by Josef Kohen's trades on May 24 and May 25. Kohen came into May 24 short three 10-year Treasury futures. On May 24, he shorted an additional contract at a price of 113-02.5, bringing his position to short four contracts. On May 25, he bought a long to offset one of his contracts at a price of 112-22. His account statements account for this transaction on a FIFO basis, so the first contract he sold short is offset, yielding a loss of $3,437.50 on May 25. If, however, the transaction were accounted for on a LIFO basis, he would have realized a profit of 12.5 x $31.25 = $390.63. Which method is more appropriate for economic purposes depends on the intent of the trade from the participant's point of view. Kohen does not comment on his intent, but it seems that he sought to take advantage of the situation created by the Federal Reserve announcement, and therefore that a LIFO accounting basis would be preferable in this context.

IV. Conflicts of Interest and Incentives Likely to Arise in Injury Theories and Modeling Decisions Prevent the Lead Plaintiffs from Representing Class Interests

67. It is worth continuing to concentrate on the May 24-25 period as an illustration of how the lead plaintiffs are at cross-purposes. During this period, Richard Hershey was *long* the 10-year Treasury future, and therefore benefited from the high prices which entailed large losses for [redacted] as it closed out its short positions. Hershey has a clear incentive to prefer a model that generates a higher price on these dates, but higher prices would increase [redacted] losses. Conversely, if [redacted]

[51] Hershey deposition, pp. 38-40 (referring to the 'Eagle 50');

REDACTED

prevails with a model that predicts lower prices on these dates, Hershey loses on his long position.

68. This conflict between the lead plaintiffs challenges their ability to represent Josef Kohen during the May 24-25 period. Kohen, in effect, initiated and closed another short position. That this puts him on the other side of Hershey's trade is obvious. But less obviously and ironically, Kohen makes a profit on this short position at the same time is losing on its short positions. would thus prefer a model that produces a lower price on May 24, but Kohen would want the same or a higher price to raise his basis and increase his profit on the May 24-25 trade.

69. I have also pointed out in ¶53 above how the timing and evolution of the Alleged Manipulation can impact determinations of injury. This is a matter on which the current lead plaintiffs disagree. Richard Hershey believes that manipulation of the June 2005 future began "as early as late 2004" and that it evolved in such a way that he was injured on both long and short positions taken in the June 2005 future thereafter.[52] Accordingly, prices would have reached their peak on May 11, and had not increased enough through May 27, if Hershey's claim is to be borne out.

70. instead claims that the Alleged Manipulation was at its worst on May 25 '

REDACTED

This is almost the exact opposite claim Hershey would seek to advance, and, as I pointed out in ¶68 above, would also be the opposite of what Kohen would like to show.

71. The lead plaintiffs are poor representatives for other possible plaintiffs because of their dissonant positions on the timing and evolution of the Alleged Manipulation. Josef Kohen claims that he realized his injury when rolling over into the September 2005 contract at the beginning of June. Although I disagree that this is the proper time to locate his injury, if any – that would be in September when he closes out his position – his interest in locating artificiality at the beginning of June conflicts with the interests of Hershey and who would prefer to locate it earlier. Indeed,

REDACTED

[52] Hershey deposition, pp. 94-100.

[53]

REDACTED

72.

REDACTED

73. Finally, since neither [redacted] nor Richard Hershey made delivery nor held short positions until the end of June 2005, the current lead plaintiffs have no incentive to represent the interests of parties who made delivery at the end of June, such as [redacted]

V. Conclusion

74. No 'true' model exists for the prices in dispute in this case, and the various choices that must be made in the course of modeling by Professor Gilbert will have a serious impact on who within the proposed class is actually injured, as well as introduce conflicts of interest among potential class members.

75. The current lead plaintiffs are not able to represent the two potential class members we have been able to consider, Josef Kohen and [redacted] Their theories of the Alleged Manipulation would not be focused on establishing injury for either party, and in the case of [redacted] would be antagonistic.

76. Finally, I emphasize that, although I have considered the specific circumstances of the parties who have already participated in discovery, the arguments developed here apply equally well to any potential class of plaintiffs. Even the attribution of injury to members of the proposed class hinges on the choice of the econometric model, as well as mundane things like accounting conventions and decisions about what constitutes a unified trade. In all of these matters, potential class members have individual considerations and interests which cannot be represented adequately in a class action lawsuit.

Mary Ann Driscoll
Notary Public
State of Maryland
Qualified in Howard County
Commission Expires
June 1, 2009

Steve H. Hanke

Sworn to before me this

31 st Day of July 2006

Notary Public